

ORIGINAL ARTICLES

THE DEBT OF HUMAN EMBRYOLOGY TO THE PRACTITIONER.

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There is probably no subject in the whole realm of the medical sciences more dependent upon the practitioner for its materials than human embryology. The practising physician alone has the opportunity to gather the windfalls without which future progress in embryology is impossible. Hence it is to practising physicians and surgeons the world over that embryologists have been, and ever will be, indebted for the many valuable specimens which they have so generously contributed and which have made the many recent advances in embryology possible.

Through the devotion of a single anatomist and the generous and unselfish co-operation of many physicians from all parts of this country, one splendid collection of almost 600 specimens has been made. It ought to be cause for special gratification that a number of the specimens in this collection were the gifts of California physicians who heard and answered the appeal made by Professor Mall almost two decades since. There are at least two embryological collections in America of which any physician or anatomist may justly feel proud. No doubt it would be a far greater and juster cause for pride in Americans if there were, as there well might be, one such collection in each state. That is a task for the future which it is well worth beginning now. What can be accomplished by the physicians of a single state is well exemplified by the physicians of Maryland who contributed 300 of the 533 specimens which composed the Johns Hopkins Medical School collection last year. This interest taken by physicians in the promotion of human embryology has been highly gratifying indeed.

The history of this collection and the admirable use to which it has been put should be an encouragement to the physicians of California. The harvest is a truly abundant and never failing one but it is unfortunately allowed to waste ungarnered, or if garnered is often permitted to waste through lapse of time or through the use of unsuitable preservatives. It has been estimated by competent authorities that 20 per cent. of all pregnancies end prematurely. Hence it is evident that if all the material which is practically wholly lost to science now, in a single one of our great cities, in a single year, could be placed in proper hands, it would form an unsurpassed and invaluable collection. Such a collection if placed in competent hands could be made productive and would eventually be bound to benefit every practitioner, even if he were located in the remotest parts of the earth. From such a collection, much information could be gained on many phases of human development; on the formation of the placenta, the age of embryos, the frequency and significance of abortion; the duration of pregnancy, the pathology of pre-natal life and on many other questions. Mall in a recent article in speaking of one of the possibilities of such a collection says,

"A great field opens to us for the study of histogenesis which binds embryology to histology to make the foundation for scientific anatomy."

The use to which embryological material has been put is well illustrated by the many articles on human embryology which have been contributed during recent years. Minot's Laboratory Text-Book of Human Embryology is based on Professor Minot's collection, and a Study of the Causes underlying the origin of Human Monsters, by Professor Mall, as well as a series of chapters in that splendid Manual of Human Embryology by Keibel and Mall and a hundred contributions besides, are based on the Johns Hopkins Medical School collection. Both these collections have made many contributions possible and will be used for many years to come by present and future investigators.

To be sure, the above are not *show* but *working* collections. Gross specimens in bottles may satisfy a passing curiosity or a collector's desire but they manifestly cannot be utilized for science—that is for the benefit of all—as long as kept in bottles whether in or out of a laboratory. The desire to make a show collection has often proven productive of much good but the day has long passed when "anatomists feared to make a thorough examination of ova and preferred rather to preserve them in alcohol." Grouped as gross specimens, in small collections and scattered here and there in offices about the country, such specimens not only deteriorate but must, of course, remain useless and unproductive of good to anyone. In proper hands this untimely harvest can be made productive indefinitely in the future and be preserved permanently from deterioration.

Since Teacher's ovum measured only two millimeters, or about one-twelfth of an inch, it may be concluded that older embryos are no longer of much value. This, to be sure, is a great mistake. Any embryo less than one inch long is a very valuable specimen in the hands of any competent anatomist and material of all ages is useful. Young specimens are, however, comparatively rare. Among the 533 specimens in Mall's collection, for example, there were only 50 normal embryos less than 8 millimeters or one-third of an inch long; but 133 normal specimens between 9 and 25 millimeters, i. e., between one-half and one inch. Mall further states that 198 specimens or approximately 37 per cent. of the total, were pathological and that 68 per cent. of these were from the first six weeks of pregnancy, 34 per cent. from the sixth to the eighth week and 18 per cent. from the last seven months.

Very young ova can, to be sure, be obtained only by some rare opportunity—but even with young ova it is very much as Burroughs said it was with birds, "How many you will see depends on how many you will look for." Herzog's experience, as well as that of others, illustrates how long vigilance is finally rewarded and as has been well said if "gynecologists will only show the proper interest and look with special care when a fresh corpus luteum is seen, the desired specimen will not remain hidden much longer." The desired stages

here referred to are the earliest unknown stages. Since the ova at this time are only a few millimeters in size these early stages can probably never be obtained in good preservation save incidentally in connection with operations.

It is well to recall in this connection that the rare and well-known specimens of Peters and Leopold were obtained at autopsy upon young women who had committed suicide, and would undoubtedly have been lost had not pregnancy been suspected and hence great care been used in examining the uteri. The embryos described by Keibel-Frassi, Herzog, Penkert and others were obtained through operation and necropsy while those of Strahl and Beneke, Fetzner and Jung were found in the material obtained by curettage. Fortunately in these cases the scrapings and the tubes were fixed immediately after operation with the embryo left undisturbed as far as possible. To be sure most of these specimens only approximate more or less closely the ideal object spoken of by Jung when he says that "The ideal of an object for human conditions would be an ovum of the first week of fertilization found in a freshly extirpated uterus which was fixed immediately in Zenker's or Flemming's fluids and then prepared according to the best technical methods. The uterus in question should, to be sure, be free from such pathological changes—myomata, chronic metritis, etc., as have according to experience a pathological influence on the imbedding of the ovum."

But it is not only such perfect specimens or such very young embryos that are desired. No matter how far it has to be shipped any embryo less than two inches long should not be thrown away unless in a bad state of preservation. Moreover, those who are near a laboratory will find that practically all unmacerated foetus, no matter what the age, and material from abortions and curettage can be made good use of and will be gratefully accepted. In case of abortion of very young ova the latter are, of course, contained in clots of blood. Hence it is well to preserve the material *in toto* in 10 per cent. formaline.

The lack of definite data regarding most embryos leaves a gap which it is impossible to fill later. I fully realize the difficulties involved and the necessarily questionable value of many of the data when obtained, but the effort to obtain them is well worth while and will often be rewarded in the most unexpected way. Moreover, even if the individual histories are unreliable or incomplete yet they may complement each other and nevertheless have a value in the aggregate which is quite unsuspected. Among the data of special value are the cause and the date of the abortion, the presence of local or constitutional disease, the nature of the damaging force if the embryo was injured accidentally, the menstrual history including the length of the intermenstrual period, the duration of menstruation and the beginning of the last menstrual period. While the need for and the value of definite data cannot be over emphasized anatomists are aware of the attendant difficulties and will indeed gratefully receive speci-

mens without any data whatever, for it is the specimens that are needed above everything else. Hence all fresh material from early pregnancies is worth preserving.

Although most specimens an inch or less in size reach the physician in a state of poor preservation, further maceration can be easily prevented. For this purpose two re-agents, one of which is always at hand in a physician's office, may be used. These are ethyl or grain alcohol, or *far preferably* commercial formaline. If the ovum is entire and alcohol is used, it is best to put it in 10-15 times its volume of undiluted ethyl alcohol. If, on the contrary, the specimen is a ruptured ovum or an embryo with the membranes ruptured, ethyl alcohol of 75-80 per cent. strength should be used in similar quantity, or better still, in excess. For convenience it may be remembered that 85 cubic centimeters of undiluted ethyl alcohol and 15 cubic centimeters of water will when mixed, give practically 80 per cent. alcohol; that is in the ratio of one ounce of water to four and one-half ounces of alcohol. If alcohol is used and the specimen is not forwarded directly to a laboratory fresh 80 per cent. alcohol should be put on the specimen in a day or two. Thereafter it need not be changed for some time.

Formaline has, among others, the advantage that it *need not be changed* and that it can be used in the same strength for specimens of all kinds and sizes. It should be used in 10 per cent. strength, i. e., one part of commercial formaline should be used to nine parts of water. Commercial formaline contains, of course, only about 38-40 per cent. pure formaldehyde, but it may be treated as containing 100 per cent. for these purposes. The usual mistake is to use too little of the preservatives in proportion to the size of the embryo. In the absence of formaline if delay in forwarding makes changing of the alcohol containing the specimen necessary the fluid should be decanted and the specimen left undisturbed. If the bottle or jar containing the specimen is filled completely no damage can come to a small embryo no matter how far it is sent or how roughly it is handled in shipment. Small specimens can best be handled with a spoon or spatula for any injury due to rough handling is likely to be more serious than suspected.

Tubes and uteri which are thought to contain early pregnancies had best be treated similarly but they should never be opened at random in order to avoid loss or damage to small embryos.

Since the matter of preservation is an all important one the use of 10 per cent. formaline is strongly advised. It is regrettable that, as Mall wrote in 1893, "Nearly all human embryos which come into the possession of embryologists are of little value for careful study, because they have been preserved carelessly. Of fifty embryos less than six weeks old which have come into the writer's hands during the last few years, only six have proved to be of value and these came from three physicians. In nearly all cases the specimen is destroyed by placing the ovum in very dilute alcohol, and in so doing it is handled very roughly.

Poor specimens, however, are better than none at all, therefore in all cases the ova should be preserved even if there be but little hope to obtain a good specimen." Unfortunately the fact that wholly different pictures are obtained from the same tissues if fixed while absolutely fresh than when fixed a long time after death, and that the character of the fixative also is a factor in distortion of the tissues have not yet received sufficient recognition.

In making this appeal for material, I have no purpose save to serve human anatomy and through it the profession. Through the donations of students and the unselfish efforts of a few physicians a beginning has already been made. But it is as yet only a beginning. We are now equipped to properly care for whatever material may be presented. Such a collection is not to be the personal property of anyone, to be sure, and all we desire is to act as stewards. Careful records will be kept containing the name and the address of the donor, such histories as it may be possible to obtain, measurements, drawings and photographs and any further data of value. This collection will, to be sure, always be accessible to any properly qualified student or physician. Specimens which cannot be utilized to best advantage here will with the knowledge and consent of the donor, be given to another laboratory as gifts of the original donor, so that all the material may be used to the best possible advantage. As is probably known to most physicians, Professor Mall has for years made a special study of pathological ova and embryos. Hence no better disposition could be made of certain specimens than to transmit them to him for study. However, since it is often not a simple matter to determine the normal or abnormal features of early ova by a cursory examination it will be appreciated if all specimens are transmitted to the undersigned for examination.

The establishment of such an embryological collection as already begun and as herein contemplated concerns every member of the medical profession on the Pacific Coast. For no matter how extensive they may be why should we be and remain wholly dependent upon collections 3000 miles distant? My primary purpose is to save this invaluable material for a California collection but if anyone prefers to send his specimens to an eastern laboratory I am sure that Professor Mall will be exceedingly grateful for them.

I have indicated what has been accomplished by the combined efforts of physicians and anatomists elsewhere. I have as ample a faith in our profession on this coast and fully expect this faith to be justified by the response to this and other appeals and by continued donations in the future. May I add that it is *your* attitude which will determine the results, for I am helpless beyond the asking.

Any small or unusual specimens will gladly be sent for or may be sent by parcel post or C. O. D. Wells Fargo, to the Anatomical Laboratory, Stanford University, California.

THE IDEAL HOSPITAL.*

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The title of the paper for this evening, "The Ideal Hospital," in its more comprehensive sense, would naturally include hospital construction; this feature alone would furnish thought for data, more than enough for one thesis. To-night, then, we will consider more particularly hospital management.

It has been said that it takes nine men and a sheep to make a woolen blanket. I quote this only to illustrate that experience has taught that under the department system, the strictest economy and highest efficiency in the manufacture of woolen goods, as well as in other lines of business can be reached.

The most successful corporations, public and private institutions, have learned by actual experience that the best results can be obtained under the department plan in the management of their business, and this applies with equal force to hospitals.

It is the exception to find the best fitted, and the best trained business men in the management of hospitals. Proper temperament, keen perception, a thorough knowledge of men, and a graceful and tactful adaptability to their varied requirements, coupled with good business and hospital training, are essential in a manager of a hospital. If it is necessary for a nurse to be trained to guarantee efficiency in her profession, why is it not as essential for a manager of a hospital to be also a hospital trained man?

While superintendents of nurses are originally chosen from the best young women in the average walks of life, ninety per cent. of them have had no practical business training. They are, however, trained in all that pertains to the management, care and teaching of the training school, the care of the sick, and a most painstaking loyalty to the hospital and to the medical profession.

I know of no line of business, in the affairs of which there is quite so much friction, and lack of harmony as is usually found in the affairs of hospitals. This is largely due to a lack of proper understanding between the management and the superintendent of nurses.

I have read a number of articles on this subject, and while they all recognized the existence of conditions referred to, none went deep enough into the subject to point out the causes, or even to suggest a remedy. One of these articles, I remember, placed the entire blame upon the superintendents of the training schools, the substance of which read something like this: "These superintendents think that hospitals are planned, constructed and maintained for their special benefit, that they are the hub around which the whole institution revolves."

While it is true that the arbitrary and dictatorial methods of some of these heads of training schools have brought reproach upon their profession, it is not the rule among the more experienced and intelligent class of superintendents.

* Paper read at the meeting of the Association of State Hospitals, Los Angeles, Cal., September 17, 1913.